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CIA Deputy Urges Curbs on R&D Information

In the most ominous development in science-government relations since the McCarthy period, Admiral Bobby R. Inman, the spy chief who last year pressured cryptology researchers into adopting a voluntary censorship system, is now pushing to apply the same publication restraints to all fields of science and technology. And he's warning that if the scientific community doesn't police itself, it will be hit by a "tidal wave" of political outrage against the "hemorrhage of the country's technology."

What's needed, Inman argues, is "an agreement to include in the peer-review process (prior to the start of research and prior to publication) the question of potential harm to the nation."

Though the Admiral, who unveiled his scheme at last week's annual meeting of the American Association for the Advancement of Science, said that he's mainly con-

cerned about technology, rather than basic research, he's been close enough to science to know that peer review is almost wholly confined to basic research. Furthermore, throughout his talk, titled "National Security and Technical Information," he repeatedly referred to "science and technology," and at various points in his address and in response to questions, referred only to "science" and "scientists" in making various points about the ease with which the Soviets monitor American research activities. Following his talk—which stirred statements of alarm from several mandarins of science—a White House spokesman was quoted by the *Washington Post* as saying that "The Administration is very concerned about the loss of technology to the Soviets. It is a matter being addressed by a number of departments and agencies. There is no consideration being given to any mandatory program for government review of scientific papers."

Defense R&D Big Gainer In FY '82 Budget—Page 8

Inman, who is Deputy Director of the Central Intelligence Agency, scored against the cryptologists while heading the National Security Agency. What's now necessary, he insists, is an extension of the self-policing principle to all fields of science and technology. The justification for this, he said, is that "Science and national security have a symbiotic relationship—each benefiting from the interests, concerns, and contributions of the other. In light of the long history of that

relationship," Inman continued, "the suggestion is hollow that science might, or should somehow, be kept apart from national security concerns, or that national security concerns should not have an impact on 'scientific freedom.'"

With "foreign intelligence services, among other entities of foreign governments...collecting all types of information in the US...it makes little difference whether the data is copied from technical journals in a library or given away by a member of our society to an agent of a foreign power," Inman said.

His prepared talk and subsequent remarks were marked by alternating expressions of reverence for the traditionally open ways of science, disdain for what he described as science's "disingenuous" self-description of its actual practices, and ominously worded warnings of science's need to act before Congress acts.

Thus, the Admiral said that "Key features of science—unfettered research, and the publication of the results for validation by others and for use by all

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In Brief

James Wyngaarden, Chairman of the Department of Medicine at Duke University Medical School, is the White House's choice for the directorship of the National Institutes of Health, vacant since Donald S. Fredrickson resigned last July. In no hurry to fill the post while the NIH budget was being trimmed, the Administration, despite early assurances of a selection by Labor Day, happily maintained the vacancy.

Wyngaarden is a widely respected clinician, and there's no political flavoring to his appointment to head the vast biomedical research complex, which benefits to some extent from the paternalistic interest of Health and Human Services Secretary Richard S. Schweiker. Also to be filled at NIH are nearly a dozen senior posts that have stood vacant pending appointing of a new chief.

The social sciences eluded the budgetary calamity that the Reagan Administration had initially planned, but they're still far behind where they stood two years ago. Thanks to Congressional intervention, the final sum for NSF's social and behavioral sciences programs in FY 1982 will be \$32.3 million, rather than the \$21 million sought by Reagan. Looks good, but in 1980, these programs were budgeted for \$52.4 million.

...Accuses Scientists of "Disingenuous" Claims

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mankind—are essential to the growth and development of science. Both our national security and our economic development rely heavily on these features. Restrictions on science and technology should only be considered for the most serious reasons."

But then, in a recitation of examples of dubious relevance to his proposal for science to collaborate in a system of prior restraint on publication, Inman said, "The fact is that restrictions exist today on science and technology. For example, in conducting medical experiments on human subjects, in safeguards on handling and storing radioactive materials, in controlling some research on gene-splicing, in protecting proprietary manufacturing processes, and in requiring peer review before publication of scientific research." What the Admiral left out is that, unlike speech and publication, none of his examples is constitutionally privileged; peer review is a quality-control device rather than a restrictive system; proprietary rights are individually asserted, rather than decreed by government, and the other examples are all within the traditional boundaries of government-mandated health and safety regulations.

Inman insisted that the "scientists' blanket claims of scientific freedom are somewhat disingenuous in light of the arrangements that academicians routinely make with private, corporate sources of funding. The strong negative reaction from some scientists, over the issue of protecting certain technical information for national security reasons, seems to be based largely on the fact that the federal government, rather than a corporation, is the source of the restriction. Yet this would presume that the corporate, commercial interests somehow rise to a higher level than do national security concerns. I could not disagree more strongly," he said.

Specifically, what scientific and technical information would Inman subject to the voluntary system?

His concerns, he said, include "computer hardware and software, other electronic gear and techniques, lasers, crop projections, and manufacturing procedures." But when it came to details of specifically what in these vast regions especially worried him, the Admiral deftly took refuge in a Catch 22 shelter:

"One sometimes hears the view," he said, "that the government has not made its case, almost always referring to the absence of specific detail for public consumption. This reasoning is circular and unreasonable. It stems from a basic attitude that the government and its public servants cannot be trusted. Specific details about why information must be protected are more often than not even more sensitive than the basic technical information itself. Publishing examples, reasons, and associated details would certainly damage the nation's interests. Public review and discussion of classified information which supports decisions is not feasible or workable." (Several days later, however, the *Washington Post*, in a followup on Inman's AAAS speech, reported that an unnamed "official" displayed a circuit board taken from a Soviet ocean buoy and said that the circuits are "direct copies of US circuits.")

What remedy does Inman propose for the problem that he declines to identify in detail?

His answer is that it would be something along the lines of the self-policing process that he cajoled the cryptologists into adopting. Under that arrangement—at least as it now stands—a researcher who believes that a prospective publication of his might be harmful to national security can elect to submit it to the National Security Agency for a fast opinion, though he's not bound to abide by NSA's verdict. Since the system went into effect last spring, 25 papers have been submitted for NSA review, according to Daniel Schwartz, former NSA general counsel, and none was considered to pose a security problem. Given that those 25 were specially selected from a much larger body of papers, the absence of security concerns does invite some wonder about the extent of the problem that's firing up the Admiral and his national security colleagues.

Though a bit vague about details, Inman, however, made it clear that he wants to go beyond the informal arrangement that NSA has with the cryptologists and attach a security role to the peer-review process (see page 3 for his exact words on this crucial item).

The immediate reaction from the high councils of science ranged from intense opposition to non-

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Inman: Conform or Be Hit by "Tidal Wave"

What did Admiral Bobby Inman have in mind when he proposed the addition of a national-security screening role to the scientific peer-review system? Since the scheme is outlandish, but its proponent—No. 2 man at the CIA—is influential, SGR herewith offers key excerpts from his prepared text, plus his taped responses to questions following his address:

Text: Rather than a confrontation between national security and science, I believe that a wiser course is possible and that our joint search for that course ought to be one of our goals. A potential balance between national security and science may lie in an agreement to include in the peer-review process (prior to the start of research and prior to publication) the question of potential harm to the nation. The details of such a system would have to be resolved, of course, but cooperation will be better for all of us than confrontation. Included in such a system should be goals to simultaneously preclude harm to US national security and to impose no unreasonable restrictions on scientific research, publication, or the use of the results. And when restrictions are judged necessary, speedy procedures for appeals, review, and appropriate compensation should be included. One example of this type of process is that recommended in the Public Cryptography Study Group [which recommended the voluntary review system that applies to cryptology]. It is not easy to create workable and just solutions that will simultaneously satisfy the wide-ranging needs of national security and science, but I believe it is necessary before significant harm does occur which could well prompt the federal government to overreact.

Q: Would you explain your proposal concerning peer review?

Inman: That's tied to the whole question of looking for joint ways to examine the problem. The government, as it's now structured, as it's now functioning, would have some difficulty in meeting that requirement [of pre-publication review for security considerations]. It was much easier to bring about some change in the government's attitude when you were dealing with a single agency [the National Security Agency]...The fundamental question is how you would establish at the outset that an idea or a field of research has a potential for harming national security. My sense of the way you would go about that is the same way [that was] proposed originally in the cryptography setting. You'd have to find a field of experts, people who are willing to sit on panels, some who have some experience in the field of research, some who have experience in government. We tried such panels in the past. But again, I have great

qualms about tying it into a regulatory system. We don't have a great deal of confidence that that would produce the kind of byplay back and forth that we want....This critic's observation [is] that regulatory bodies quickly grow into their own existence.

Q: Would this involve another layer of peer review, or would the existing peer-review apparatus simply consider national security in addition?

Inman: It really is the latter, but [the problem] is the mechanism of how you bring that about, how do you give them some wisdom to make it work. And the heart of the answer to the question of this public cryptology group is—it really is peer pressure that ultimately determines, in my view, whether it will really be effective. It ultimately comes down to peer pressure. If there is very strong peer pressure from those working in the field to review, and if NSA gives a quick response, it doesn't become bureaucratic.

Q: Do you accept the argument that controls are counterproductive in that, even under a voluntary system, many people are unwilling to work in areas that involve submitting their manuscripts or their work for review before they are allowed to publish?

Inman: ...at the heart of what I have been trying to convey in all this discussion is, I think, that the tides are moving, and they're moving pretty fast toward legislative solutions that, in fact, are likely to be more restrictive than Executive orders, not less—if I get correctly the mood of much of the country about worries on the national-security side. Partly I'm influenced by knowing some things that are going to be very much in the headlines in the next six months as the Congress turns in some of its investigations to the whole subject of technology transfer. And when the depth and degree of technology transfer in facilitating the massive arms buildup of the Soviets becomes broadly apparent to the public, there are going to be intense additional pressures for legislative remedies to the hemorrhage of the coun-

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RESTRICTIONS *(Continued from page 2)*

committal caution. In comments to the press, William D. Carey, Executive Officer of the AAAS, expressed strong concern about prior restraint and giving the national security establishment a role in scientific publication.

Frank Press, President of the National Academy of Sciences, said that open publication is part of a free society; he was also reported as saying that Inman had opened a dialog with academe on the security issue and that that was something new in intelligence affairs.—DSG

France: Big Budgets Astonish the Scientists

Paris. Kind words for science, but not much else, have long been routine in modern French politics. The Mitterrand government, however, has been accompanying the traditional rhetoric with spending increases of such magnitude that the research community here is quite astonished.

The newly approved budget provides for a 29 percent jump over current spending, and the indications are that this will not be a one-time event, for the President and his senior associates are, if anything, intensifying their praise for the wonders they expect—perhaps unrealistically—from the national research enterprise.

Thus, at the end of November, in the course of dedicating the immunology center at the Pasteur Institute, Mr. Mitterrand praised medical research as an essential ingredient of national well-being and told the assembled researchers that “the government will provide the impetus and the means. The rest belongs to you.”

Meanwhile, the Minister for Research and Technology, Jean Pierre Chevenement, has been carrying a similarly uplifting message to the provincial areas in preparation for his long-planned national conference on research and technological development in mid-January in Paris. The stated objective of this super conference is to sensitize the scientists and technologists to the social and political effects of their endeavors and to energize them to think fresh ideas for development of a long-term research and development plan. The steps leading to the conference have been quite elaborate.

To stir up interest, Chevenement held preparatory

conferences in each province. Called “Regional Assizes” and touted as a modern-day descendant of the French revolutionary tradition, the conferences stirred a good deal of participatory fervor, despite the fact that the locals realized that the long-term R&D plan—like most everything else in French public life—remains dominated by long-entrenched civil servants deep in Paris bureaucracies. Nonetheless, the enthusiasm for these gatherings was so intense that some government laboratories stopped work during October and November to devote themselves to deliberations and the preparation of voluminous reports that few managers can possibly find time to read.

In all the provincial towns, basic researchers and developmental and industrial engineers got together (truly a rare event) to celebrate the glory of R&D with the minister. The whole operation was so well orchestrated that the CFDT, a union with Socialist leanings, took to sulking about dominance by “mandarins and masters.” During his appearances in the provinces, Chevenement didn’t announce anything firm or definite. He promised to re-examine the careers of young researchers, but on the whole he stuck with well-known plans: Toulouse, in the south, will become specialized in robots; Grenoble, in the Alps, in microelectronics, etc.

However, his promises for financing were so generous that after the last show, at Orsay, a suburb of Paris, the researchers applauded while chanting “another, another,” which is a variation on calling for an encore

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INMAN *(Continued from page 3)*

try’s technology.

It’s in that kind of mood that you overreact and that’s why it’s so important for the [scientific and technical] societies to follow the lead of the ACE [American Council on Education, which helped organize the deliberations that led to cryptology screening arrangement], and stimulate dialogs with the pertinent part of the government, now not afterwards, and seek to define the national-security areas of concern, the areas of technology which have a potential value to adversaries. And unless I’m far wrong, I think that in the latter half of this decade, we’re going to be defining that in economic competition terms, not just military terms.

I get some sense from some of the dialog—don’t give us any regulation, any regulation of any kind is inherently bad...I understand why that view is held. I also think it’s about to be wiped away by a tidal wave and that it therefore is important to do exactly the same

thing that some very bright people did in the academic world in suggesting that [cryptology] study group. That idea didn’t come from me. It came from within the academic community. And they said, “Let’s get consulted in advance of the kind of way you can try to deal with the problem that may preclude the kind of subsequent action, either by fiat or by legislation, that we would consider far more repressive to this whole question of academic freedom”...

May I make a point that I should have made in the paper but did not? A personal persuasion that basic research has rarely presented significant problems....Basic research has caused minimal worries from the national security standpoint....It’s ideas about how to apply [research] that gets you much more rapidly into an area of conflict. [I offer] merely a suggestion that the [AAAS], as they look at the problem, clearly put applications at the head of the list, that there is far less likelihood of a conflict or concern to try to restrict basic research.

... The Mandarins Battle Over Office Space

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from a performer. In scientific memory, never had there been such a ministerial success.

The irresistible ascent of Jean Pierre Chevenement has not occurred without some gaffes along the way. At Rennes, he stated that putting a high-speed train into operation between Paris and the capital of Brittany would do more for R&D than the region's researchers could accomplish. The Bretons are sensitive, and from now on they will mistrust the minister who loves trains so much.

It was also a gaffe that led him to change the directors of the National Center for Scientific Research (CNRS) before he should have. It had been agreed that the management of CNRS, the largest basic research organization in France, would change in mid-1982 when the minister demanded the departure of the man in charge of human sciences, a liberal economist. The CNRS president and general manager, shortcircuited by the whole affair and shocked by the application of political criteria in the choice of research directors, resigned. They have been replaced by, respectively, Claude Frejaques who was General Delegate for Scientific and Technological Research (DGRST), which managed financial aid for basic research, and Jean Jacques Payan, a mathematician from the Boubaki group who has never hidden his Socialist leanings.

The "Spoils System," which had not been seen since 1945, is gradually overtaking the management of the research agencies. After the CNRS, the governmental Center for Telecommunications Research, saw its management decapitated. Here we don't have a Socialist director, but rather a learned dual leadership composed of a Gaullist and a Communist. In addition, after the Regional Assizes were over, Chevenement broke up the DGRST. From now on the Ministry for Research and Technology has three main directorates: one for administration, one for scientific affairs, which is under a Socialist, and one for intervention in business, which is under Maurice Allegre, the formidable manager who under President Pompidou directed the establishment of the French data-processing industry. This ensemble is completed by a mission on scientific information which will be headed by a Communist mathematician since one must be careful now to calibrate with precision the political coloration of top management.

This parceling out didn't work out smoothly between the Minister for Research and Technology, who is a Socialist close to the Communists, and the Prime Minister and the President, who are more moderate. One of the liveliest fights between the two clans is about the taking over of the prestigious premises of the renowned Ecole Polytechnique, an enormous historic

building located in the heart of the academic district which for the French is the center of their scientific and intellectual universe. The Polytechnique having moved to the country, Jean Pierre Chevenement wanted to take over the premises and move his ministry there in February. President Mitterrand's counselors tried to oppose this expansionism by using an innovative tactic. They announced the creation of research centers (in human sciences) which they stated would be located at the vacated site. The President of the Republic himself announced the creation of a "Center for Studies on Science and Advanced Technologies" for stimulating the development of innovative technologies and studying their impact on society. Jean Pierre Chevenement responded without delay by putting into operation a "Center for Prospectives and Evaluations" which would be directly under him. This is not any more illogical than the effort by philosophers and psychoanalysts who are lobbying for a "Parisian College of Philosophy."

The fiercest battle over square meters is that for the "Center for the Development of Human Resources." The journalist Jean Jacques Servan-Schreiber, who was briefly a Minister under Giscard d'Estaing, mounted in

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In Print

United States Food and Agricultural Research System, Congressional Office of Technology Assessment report on USDA and the State agriculture experiment research stations. Gentle in its criticisms, as is OTA's style, this comprehensive look at ag research nevertheless provides a clear picture of parsimonious funding, lethargic leadership, and general lack of needed orchestration. (212 pages, \$7, available from: Superintendent of Documents, USGPO, Washington, DC 20402; specify Stock No. 052-003-00860.)

Only One Science, published by the National Science Board—alleged policymaking body of the National Science Foundation—is described as the "12th annual report" of the Board, but tells nothing about the Board. Rather, it's a slickly turned out booster for science—obviously inspired by hard times—focusing on six fields of research: computers, pest control, seismic exploration, survey and opinion research, synthetic fibers, and medical x-ray techniques. The aim, Board Chairman Lewis M. Branscomb wrote in a letter of transmittal to the White House, is to help Americans understand the value of science. Just the kind of lobbying-in-disguise publication that the tightfisted Reaganites are determined to terminate. (216 pages, available without charge from: National Science Board, 1800 G St. Nw., Washington, DC 20550.)

Another Round of Press-Keyworth Exchanges

What might be called the Frank and Jay show is shaping up into a regular feature of the Washington science-policy scene as Frank Press, President of the National Academy of Sciences, and George (Jay) Keyworth, the White House science adviser, pitch their contrasting views on federal support of science.

Their first time out was in late October, when Press invited Keyworth to address an assemblage of senior scientists rendered feverish by Mr. Reagan's proposed 12-percent-across-the-board budget cut (SGR Vol. XI, No. 18). The two then appeared in December at a hearing held by the House Science and Technology Committee (Vol. XI, No. 21). In their latest performance, at last week's meeting of the American Association for the Advancement of Science, they appeared several days apart from each other, but one may deduce from their texts that each had the other on his mind.

The Keyworth theme is that we're doing great in research and development, pulling in flocks of Nobel prizes, outspending most of the world put together, and performing in a fashion that shows "the condition of US science is generally healthy"—despite the wails of the doomsayers.

It's so healthy in his view, that it will benefit from the fiscal pruning that the Reagan Administration has decreed, "just as the occasional pruning of a tree can promote, rather than retard, its health. While this is not

a popular notion," the presidential Science Adviser told the AAAS, "budget stringencies force us to think more deeply about how and why we make choices and whether we are in fact using our resources to best advantage."

His own research experience—as a physicist at the Los Alamos National Laboratory—led him to conclude "that the best overall quality of research may not occur in times of accelerating support but in times of moderate restraint that force qualitative decisions," Keyworth continued.

But like it or not, he said, the go-go days have passed, and science will have to learn to live with austerity. The growth is gone, "and we need the scientific community's best and most thoughtful judgment and advice to maintain the health of our science and technology base. To those who object to such undertakings, and to all my scientific colleagues," Keyworth declared, "I must say that if we scientists do not make such choices, others will, with less acuity."

Most of Press's AAAS talk dealt with recent developments in research, but after detailing a flock of modern day scientific wonders, Press returned to the theme of the federal role in science.

The government, he noted, "has clearly accepted responsibility for basic research in the United States," for which it now provides about \$6 billion a year, some 70 percent of the national total.

"However," Press continued, "the government has not always in its policies accepted the associated responsibilities: the need to assure continuing strengthening of the scientific enterprise itself and of the principal home for science in the United States, the research universities."

"Science is the wellspring of technology, and technology is indisputably the base on which the United States economy will grow and remain internationally competitive in the decade ahead."

"I thus find it odd," Press went on, "that we should engage in annual debates on whether to fund real growth in the federal budget for basic research. I find it even odder considering the almost insignificant amount that basic research represents in a federal budget of over \$700 billion."

"Other countries are not making that mistake. They recognize the close coupling of basic science to economic vigor, and are shaping their national policies accordingly."

Press continued, as had Keyworth, with the predictable rhetoric that flows from their respective starting points. So far, the two statesmen of science have not gone head to head. Isn't it about time for a freewheeling debate?

FRANCE (Continued from page 5)

great secret, and with the backing of President Mitterrand, a project which has the double purpose of attracting to France foreign researchers to work on the development of personal data processing systems. He was able to get foreign specialists to collaborate on his presentation report for the project. According to this report, which was presented with great ceremony at the Elysee, the "world center" located in Paris "would provide a decisive impetus to the means which will put information at the service of the development of human resources." From the US came Seymour Papert and Terry Winograd of MIT, and Alan Kay of Palo Alto, who also agreed to contribute to "hasten the leap towards the personal computer." Jean Jacques Servan-Schreiber claimed 100 million francs per year for his setup. This represents 0.4 percent of the budget for governmental research. There is no other data available.

The Minister for Research and Technology on whom this center has been imposed from the "outside" has shown no more enthusiasm than has the French information community, who were first informed of the project at the time of its publication. Maneuvers and counter-projects are in the works.—FS

Latest Science Indicators Chock Full of R&D Data

Long overdue, but still welcome for aficionados of science-policy affairs, *Science Indicators 1980*—fifth in a biennial series of minute data on the state of US science—has finally worked its way out through the federal maze.

Sponsored by the National Science Board of the National Science Foundation, and issued as the NSB's 13th annual report (in mysterious coincidence with the Board's 12th annual report—see In Print, page 5), *Science Indicators 1980* contains a vast store of information in its 368 pages. Subject include:

- US R&D spending in comparison to other countries. In 1978, our \$48.3 billion (in federal and non-governmental funds) exceeded the combined R&D spending of France, West Germany, and Japan, which totaled \$46.5 billion.

- US showings in the world's scientific literature, which, overall, remained stable at about 37 percent from 1973-79.

- Public attitudes toward science and technology, as revealed by surveys. Favorable attitudes remain high, but they've fallen off in recent years.

- International technology trade, in which the finding was that sales by the US exceed purchases ninefold.

The report also covers salaries, employment, industrial R&D, and university-based research, and contains about 150 pages of charts and tables.

Copies are available without charge from: The National Science Board, 1800 G St. Nw., Washington, DC 20550.

News Notes: Students, Jobs, Minorities, Etc.

The ups and downs of enrollments in various fields of science and engineering, plus cautious forecasts on employment, are contained in a new report from the Scientific Manpower Commission.

Among its major points:

- The number of bachelor's degrees in the physical sciences remained about level through the 1970s, but physics plummeted 73 percent, while the geosciences were up by 86 percent and chemistry up by 37 percent.

- The shortage of computer science graduates is getting worse and is likely to continue that way because of a shortfall of about 10 percent in engineering and computer teaching staffs.

- Since 1966, nearly 1.3 million foreign scientists and engineers have joined the US labor force.

- Some manpower shortages might develop in the medical sciences during the '80s, but overall, the life sciences face a surplus of graduates relative to job openings.

The report, *Supply and Demand for Engineers*, by Betty Vetter (52 pages) is available for \$25 per copy from: Scientific Manpower Commission, 1776 Massachusetts Ave. Nw., Washington, DC 20036.

A National Organization of Puerto Ricans in Science and Engineering was formed last week at the annual meeting of the American Association for the Advancement of Science. It aims to encourage more Puerto Ricans to join the two professions and to "advance the status and increase the visibility" of Puerto Rican scientists and engineers. Additional information is available from the Secretary of the organization, Pablo Clemente-Colon, NOAA/NESS (S/RE13), WWB, Room 810, Washington, DC 20233; tel: (301) 763-8087.

Nicholas Wade is leaving the *Science* magazine News and Comment section to become an editorial writer at the *New York Times*. Wade, author of the *Nobel Duel* (Anchor/Doubleday, 1981), will fill the spot vacated by Philip Boffey, also a *Science* alumnus, who gave up editorial writing to return to reporting as a member of the *Times*'s science-news staff.

Mosaic, the six-times-a-year science magazine produced by the National Science Foundation, may get the axe as part of the Reagan Administration's wholesale campaign against government publishing. The magazine operates on a budget of about \$200,000 a year. If it doesn't get a reprieve from the Office of Management and Budget by mid-March, publication will cease.

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Defense Gains as Other R&D Funding Slumps

Defense research and development spending goes up; most other R&D goes down. That's the final outcome, as far as R&D is concerned, from Ronald Reagan's tumultuous first year in office.

According to a newly produced review of the federal R&D spending picture, compiled for the American Association for the Advancement of Science under the direction of Willis H. Shapley, the main fiscal features of R&D a la Reagan are as follows:

- Congress finally approved about \$40 billion for R&D in fiscal 1982, which began last October 1. That amount, spread among about a score of federal agencies, is an 8.1-percent increase over the funds available in 1981, and a 20.9-percent increase over 1980-82. The distribution, however, was such that defense R&D got all the increase, while non-defense spending went down.

- In constant dollars, the AAAS report states, "Our estimates, based on an assumed inflation rate of 9 percent per year in both FY 1981 and FY 1982, indicate real growth in defense R&D of 22 percent over the two-year period FY 1980-82, but a real decline of 16.1 percent in non-defense R&D in the same period."

- Basic research spending follows the same pattern

of defense up and civilian down in terms of purchasing power. Thus, over 1980-82, basic research supported with Defense Department funds will rise a "real" 6.6 percent, while civilian-supported research will go down by exactly that percentage.

- The nearly government-wide 12-percent budget reduction that Mr. Reagan proposed in September—with an ensuing explosion of protest from the scientific community—was trimmed to about one-third that amount in Congress. Though the boost for defense R&D is conspicuous for its girth, it would have been larger, except for Congressional opposition. In fact on Capitol Hill, defense R&D suffered bigger cuts than civilian R&D. The Congress clipped 6.7 percent from defense R&D in the budget that Mr. Reagan submitted last March, and took another 1.4 percent from his September budget revisions. The civilian reductions over that span were about half that amount.

(The report, 9 pages of text plus 22 pages of budget tables, is titled *Congressional Action on Research and Development in the FY 1982 Budget*. One to six copies are free—beyond that \$2 each—from: Office of Public Sector Programs, AAAS 1776 Massachusetts Ave. Nw., Washington, DC 20036; tel. (202) 467-4310.)

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